Listing of Claims:

1. (canceled)

2. (canceled)

3. (previously presented) A robust adaptive filter comprising:

an adaptive filter utilizing a fast converging adaptive algorithm;

means for modifying said algorithm by the application thereto of an adaptive scaled non-linearity; and

a double talk detector connected to said adaptive filter for disabling said adaptive filter in response to the detection of double talk on a telephone circuit;

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wherein the fast converging algorithm is PNLMS.

4. (previously presented) A robust adaptive filter comprising:

an adaptive filter utilizing a fast converging adaptive algorithm;

means for modifying said algorithm by the application thereto of an adaptive scaled non-linearity; and

a double talk detector connected to said adaptive filter for disabling said adaptive filter in response to the detection of double talk on a telephone circuit

wherein the fast converging algorithm is PNLMS++.

5. (previously presented) A robust adaptive filter comprising:

an adaptive filter utilizing a fast converging adaptive algorithm;

means for modifying said algorithm by the application thereto of an adaptive scaled non-linearity; and

a double talk detector connected to said adaptive filter for disabling said adaptive filter in response to the detection of double talk on a telephone circuit;

wherein the fast converging algorithm is APA.

6. (previously presented) A robust adaptive filter comprising:

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an adaptive filter utilizing a fast converging adaptive algorithm;

means for modifying said algorithm by the application thereto of an adaptive scaled non-linearity; and

a double talk detector connected to said adaptive filter for disabling said adaptive filter in response to the detection of double talk on a telephone circuit;

wherein the fast converging algorithm is PAPA.

7. (previously presented) The filter of claim 3, wherein the adaptive scaled non-linearity is given by the formula:

$\Psi(\frac{|e_n|}{s})$ sign $\{e_n\}s_n$, wherein Ψ is a hard limiter; and $(\frac{|e_n|}{s})$ is the mean error divided by a scale factor; and $\{e_n\}$ is a sample of echo signal; and s_n is a scale factor.

8. (previously presented) The filter of claim 4, wherein the adaptive scaled non-linearity is given by the formula:

$\Psi(\frac{|e_n|}{s})$ sign $\{e_n\}s_n$, wherein Ψ is a hard limiter; and $(\frac{|e_n|}{s})$ is the mean error divided by a scale factor; and $\{e_n\}$ is a sample of echo signal; and s_n is a scale factor.

9. (previously presented) The filter of claim 5, wherein the adaptive scaled non-linearity is given by the formula:

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$\Psi(\frac{|e_n|}{s})$ sign $\{e_n\}s_n$, wherein Ψ is a hard limiter; and $(\frac{|e_n|}{s})$ is the mean error divided by a scale factor; and $\{e_n\}$ is a sample of echo signal; and s_n is a scale factor.

10. (previously presented) The filter of claim 6, wherein the adaptive scaled non-linearity is given by the formula:

$\Psi(\frac{|e_n|}{s})$ sign $\{e_n\}s_n$, *wherein* Ψ is a hard limiter; and $(\frac{|e_n|}{s})$ is the mean error divided by a scale factor; and $\{e_n\}$ is a sample of echo signal; and s_n is a scale factor.

11. (canceled)

12. (canceled)

13. (previously presented) A robust echo canceller comprising:

an adaptive filter for outputting an error signal in response to a detected echo signal; and

means for supplying adaptive filter coefficients to said filter, wherein said filter coefficients are given by the formula: $h_{n+1} = h_n + \frac{\mu}{x_n^T G_n x_n + \delta} G_n x_n \varphi(|e_n|) sign\{e_n\}$, wherein h_n is the estimated echo path; μ is the overall step size parameter; G_n is the excitation matrix; x_n is the excitation vector; δ is the regularization parameter that prevents division by zero; $|e_n|$ is the mean error; and $\{e_n\}$ is a sample of echo signal.

14. (previously presented) The echo canceller of claim 13, further comprising a double talk detector connected to a telephone circuit for disabling said means for supplying adaptive filter coefficients in response to the detection of double talk on said circuit.

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15. (previously presented) A robust echo canceller comprising:

an adaptive filter for outputting an error signal in response to a detected echo signal; and

means for supplying adaptive filter coefficients to said filter, wherein said filter coefficients are given by the formula: $h_{n+1} = h_n + \mu G_n X_n R_{xx}^{-1}(n) \left[\varphi(|e_n|) \odot \text{sign}(e_n)\right]$, wherein h_n is the estimated echo path; μ is the overall step size parameter; G_n is the step-size matrix; X_n is the excitation matrix; R_{xx}^{-1} is the correlation matrix; $|e_n|$ is the mean error; $\odot$ denotes elementwise multiplications; and $\{e_n\}$ is a sample of echo signal..

16. (previously presented) The echo canceller of claim 15, further comprising a double talk detector connected to a telephone circuit for disabling said means for supplying adaptive filter coefficients in response to the detection of double talk on said circuit.